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Steklov-Neumann Eigenproblems and Nonlinear Elliptic Equations with Nonlinear Boundary Conditions.

We will present existence results for nonlinear elliptic equations with nonlinear boundary conditions. We introduce the notion of ‘eigenvalue-lines’ in the plane; these eigenvalue-lines join each Steklov eigenvalue to the first eigenvalue of the Neumann problem with homogeneous boundary condition. The nonlinearities involved asymptotically stay, in some sense, below the first eigenvalue-lines or in a quadrilateral region enclosed by two consecutive eigenvalue-lines. The proofs are based on variational methods. (Received August 14, 2010)